

Techniques for Material Saving for Cellulose Acetate Composition Material Spectacle

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Abstract - Spectacles are in use over the world since time immemorial. Generally people with weak eyesight use spectacles with different lenses but now a days with growing fashion consciousness the designer frames are getting place among celebrities and the youth. The frames may be manufactured from metal or plastic. With plastic technology development, the plastic frames of various designs have continue to capture the market regularly as compare to other frames. Among plastic materials, the Cellulose Acetate (CA) is most widely used plastic material in spectacle industry. In India most manufacturing units are in Maharashtra and Gujarat. More than 130 units are working in Gujarat. Industry has very good export potentials. The industry is rapidly growing and may touch to Rs. 43000 crore from RS. 20100 crore. About 75000 frames are being manufactured in Gujarat every day. A small piece of material saved for every piece of frame will add to sustainability of the industry. The present study was undertaken with broad objective of reduce material wastage and to get cost effective product. The methodology adopted to minimize the wastage of CA sheet was modification in blanking-inside cutting of plastic frame. The original inside cutting process had significant wastage of CA sheet. In the modified method the lower half part of the frame was cut into small pieces and these pieces are joined to the upper half portion of the frame using acetone to make a complete frame. These resulted in significant reduction in wastage of CA sheet.

Index Terms - Cellulose Acetate, Spectacle, Blanking

I. INTRODUCTION

Blank are created using milling or using blank punching machines, so lots material losses during blanking operation. Material wasted in blanking operation is shown by colored portion in below given figure

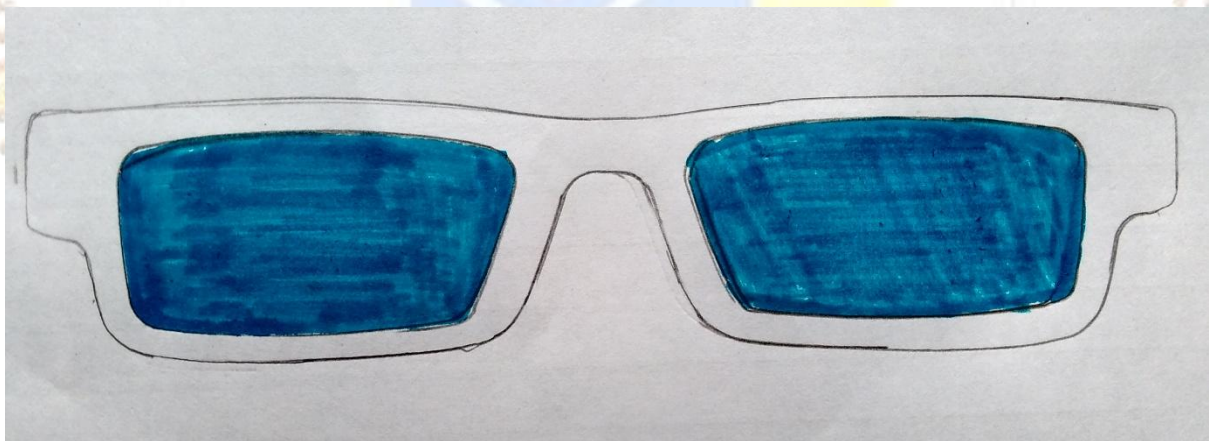


Fig.1 Material wastage in blanking process

Bulk of the waste from the lens portion of the frame is produced. To reduce this wastage we have prepared new cutting way. Dotted line shows new way of cutting row material block.

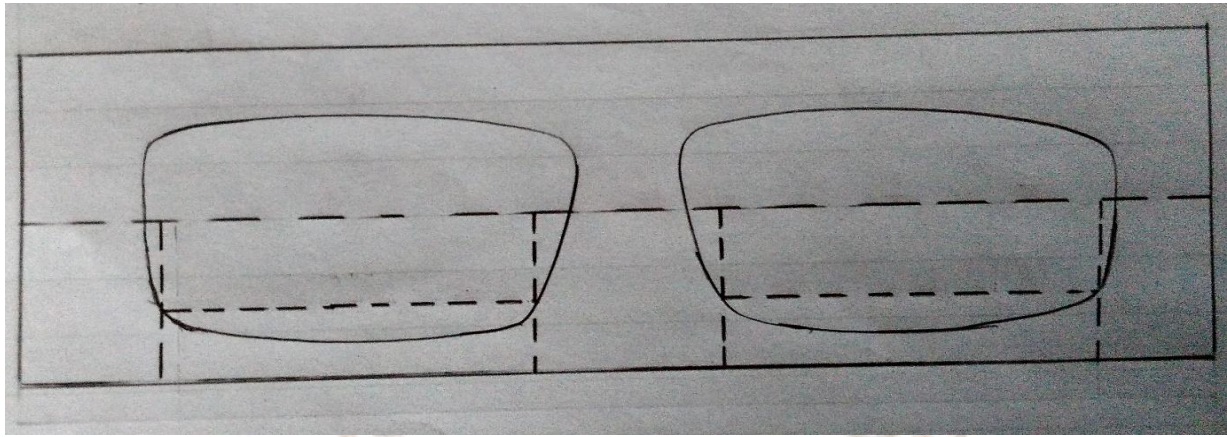


Fig.2 New cutting way

As a result of this we are going to save almost fifty percent material wastage occurs during the blanking process. We will glue all the cut sections of the raw material to get the desired shape of the spectacle frame. After that conventional processes will be performed to get finished front portion of frame.

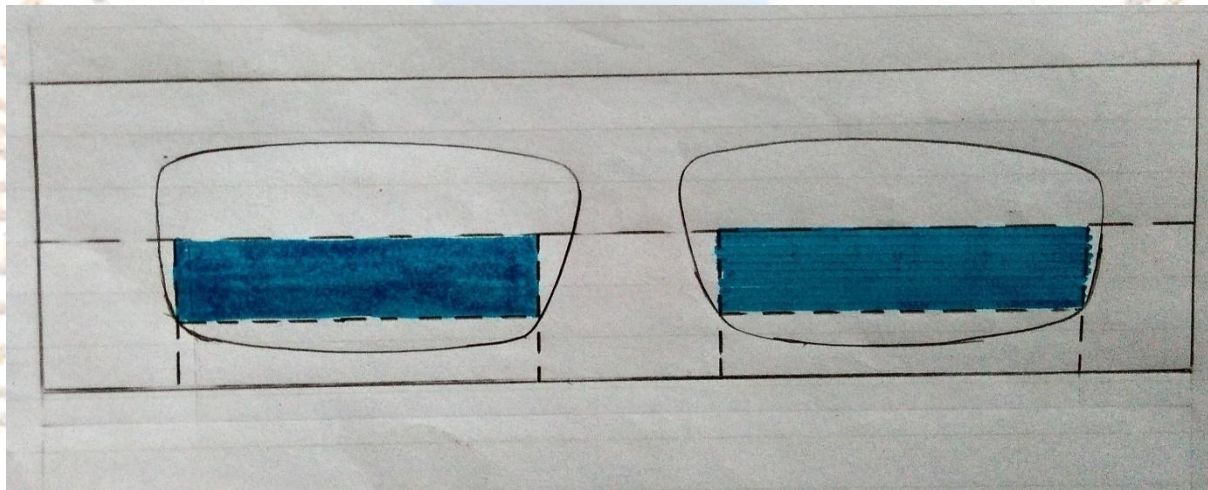


Fig. 3 Material saved after new cutting method (colored portion)

After applying new cutting method material loss occurs in blanking process material wastage reduced to considerable amount. Actual models based on new cutting method are as shown in figure below



Fig.4 front part of eyewear

I. LITERATURE SURVEY

Brett and Andreas(2011) in their research on "**Low inventory method of making eyeglasses**" invented a very low inventory method of making eyeglasses. Two lens elements having special complementary surfaces are provided. These lens elements can be positioned relative to each other to provide wide ranges of focus correction and astigmatism correction. Various preferred embodiments of the invention are described. In one embodiment the required inventory is only identical sets of two complementary lenses for providing correction for almost all needed eye correction for a typical population. In this embodiment, the lens units are first adjusted relative to each other to provide a desired focusing power. Astigmatism may be corrected by a small adjustment in a second direction perpendicular to the first direction followed by a rotation of the two lenses about the axis of the two lenses. When the adjustments have been made the two lenses are fixed with respect to each other and installed in eyeglass frames. Cutting to the shape of the eyeglass frames can occur either before or after the fixing.

II. CONCLUSIONS

Huge wastage occurs in blanking method reduced by almost fifty percent with application of new cutting method. This will help to improve sustainability of industry. Two separate portions of fronts are joined together to reduce the wastage occurs in blanking process. Almost half material wastage of raw material reduces. Other wastage can be used in making nose pads so no need to cut nose pads separately hence more material saving. Various color combination is possible in front also. It can be used for aesthetic purpose also. To implement this new method all dies used in cutting process need to be changed so this increases implementation cost. Also chances of errors are much more than normal manufacturing method. In further manufacturing processes these fronts are heated which causes distortion of shape of front. This method cannot be applied to poor quality cellulose acetate.

III. REFERENCES

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- [2] Davide Orsi Mazzuccheli; Elena Orsi Mazzucchelli (2015). Manufacturing process of a product based on cellulose acetate with blended colour, and product, such as spectacles, obtained by such process. United States Patent – US 2015/0085242 A1.